National Institute of Environmental Health Sciences

The socio-spatial dynamics of extreme urban heat events: The case of heat-related deaths in Philadelphia

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Year: 2009
Journal: Applied Geography. 29 (3): 419-434

Abstract:

Heat is the number one weather-related cause of mortality in the United States; typically punctuated by extreme heat waves. This study examines the relationship between the spatial distribution of vulnerable populations, satellite-detected urban heat island (UHI) and heat-related mortality distributions during a 1993 extreme heat event in Philadelphia, PA. Geostatistical methods are used to compare spatial distributions of vulnerability and to determine concentration of mortality within surface UHI intensity levels. The results suggest the spatial distribution of urban poor is congruent with heat-related death. Additionally, deaths are concentrated in higher order surface UHI intensity levels. The findings suggest that surface UHI measures and population in poverty are important variables in spatially measuring risk from extreme heat events. Coupling surface UHI measures with socioeconomic indicators of vulnerability may enable creation of risk models with improved spatial specificity to assist public health professionals. This approach is demonstrated by developing a linear regression model of potential risk in Philadelphia for the 1993 extreme heat event.

Source: http://dx.doi.org/10.1016/j.apgeog.2008.11.004

Resource Description

Early Warning System:

resource focus on systems used to warn populations of high temperatures, extreme weather, or other elements of climate change to prevent harm to health

A focus of content

Exposure :

weather or climate related pathway by which climate change affects health

Temperature

Temperature: Extreme Heat

Geographic Feature:

resource focuses on specific type of geography

Urban

Geographic Location: ☑

resource focuses on specific location

United States

Health Impact: ☑

specification of health effect or disease related to climate change exposure

Injury, Other Health Impact

Other Health Impact: heat related mortality

Mitigation/Adaptation: ☑

mitigation or adaptation strategy is a focus of resource

Adaptation

Population of Concern: A focus of content

Population of Concern: ☑

populations at particular risk or vulnerability to climate change impacts

Children, Elderly, Low Socioeconomic Status, Racial/Ethnic Subgroup

Other Racial/Ethnic Subgroup: Black;asian;native american;hispanic

Resource Type: ☑

format or standard characteristic of resource

Research Article

Timescale: ☑

time period studied

Time Scale Unspecified

Vulnerability/Impact Assessment: ☑

resource focus on process of identifying, quantifying, and prioritizing vulnerabilities in a system

A focus of content